CLAIMS

What is claimed is:

1. A donor film of a low molecular weight full color organic electroluminescent display device, the dornor film comprising:

a substrate film;

a photothermal conversion layer formed on the upper part of the substrate film; and

a transfer layer formed on an upper part of the photothermal conversion layer and formed of a material comprising a low molecular weight material,

wherein a part of the transfer layer which is irradiated and heated by a laser is separated from the photothermal conversion layer according to change of an adhesion force of the transfer layer with the photothermal conversion layer,

while a part of the transfer layer which is not irradiated by the laser is fixed to the photothermal conversion layer by an adhesion force of the transfer layer with the photothermal conversion layer, and

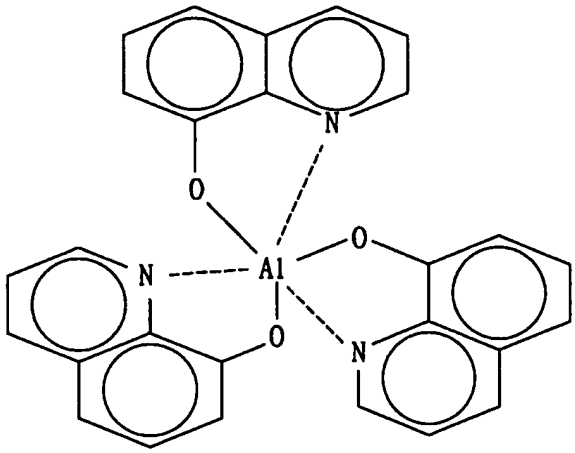
an adhesion force between a substrate of organic electroluminescent display device to which the material comprising low molecular weight material formed on the transfer layer is transferred and the material comprising low molecular weight material and an adhesion force between the photothermal conversion layer and the material comprising low molecular weight material are greater than an adhesive force between the material comprising a low molecular weight material of a laser irradiated region in the transfer layer and the material comprising a low molecular weight material of a laser non-irradiated region,

so that the material comprising the low molecular weight material of the laser irradiated region and the material comprising the low molecular weight material of the laser non-irradiated region are separated with respect to each other to cause mass transistion from the photothermal conversion layer to the substrate.

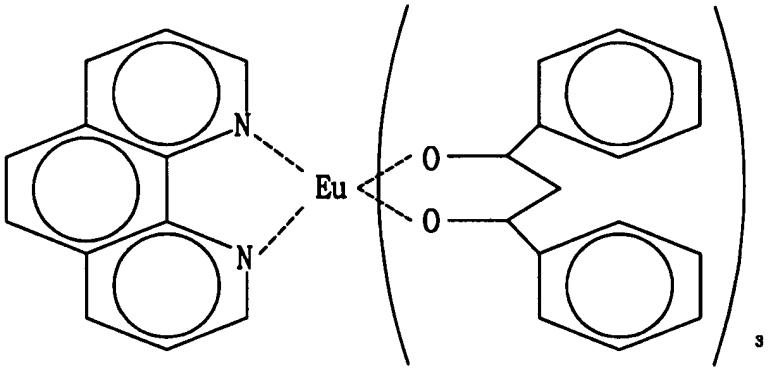
2. The donor film of the low molecular weight full color organic display electroluminescent device of claim 1, wherein the transfer layer comprises at least one low molecular weight electroluminescent material.

3. The donor film of the low molecular weight full color organic display electroluminescent device of claim 2, wherein the low molecular weight organic electroluminescent material comprises at least one material selected from compounds represented by at least one of the following Formulas 1 to 13:

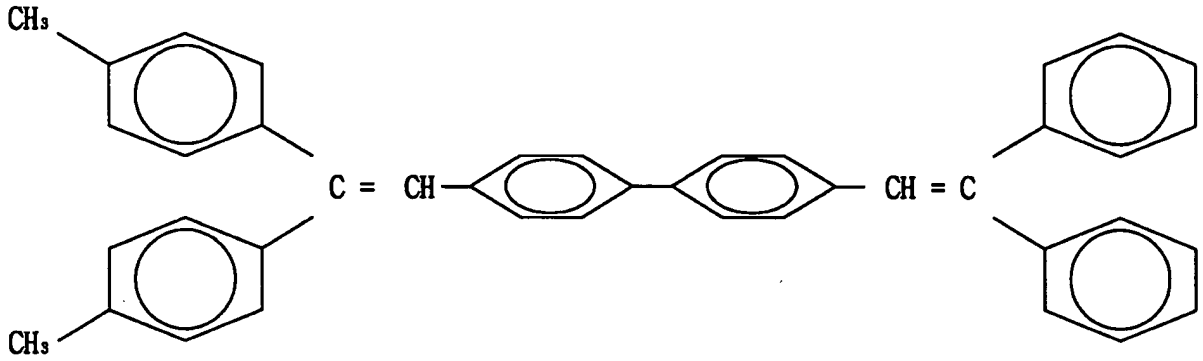
Formula 1



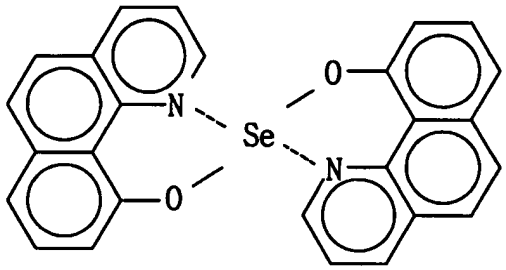
Formula 2



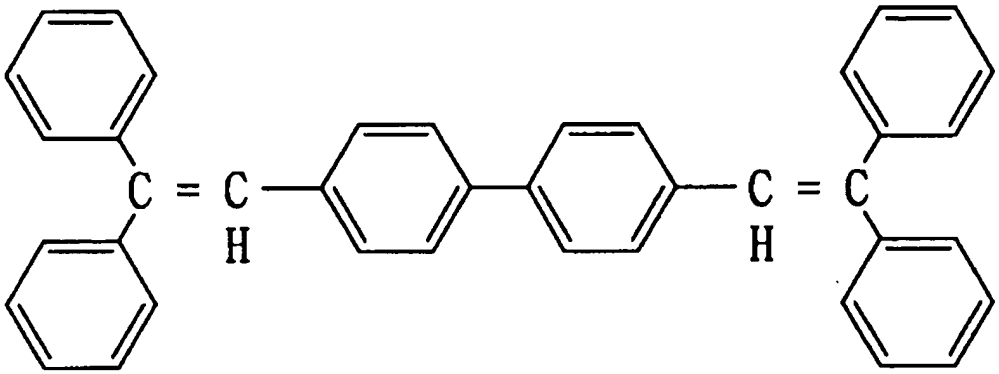
Formula 3



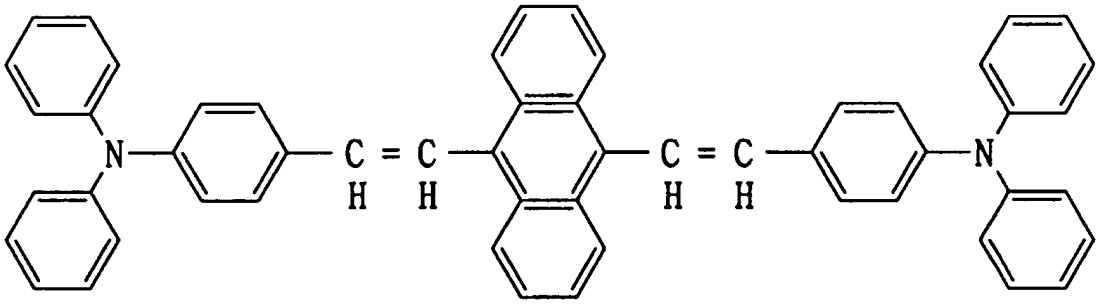
Formula 4



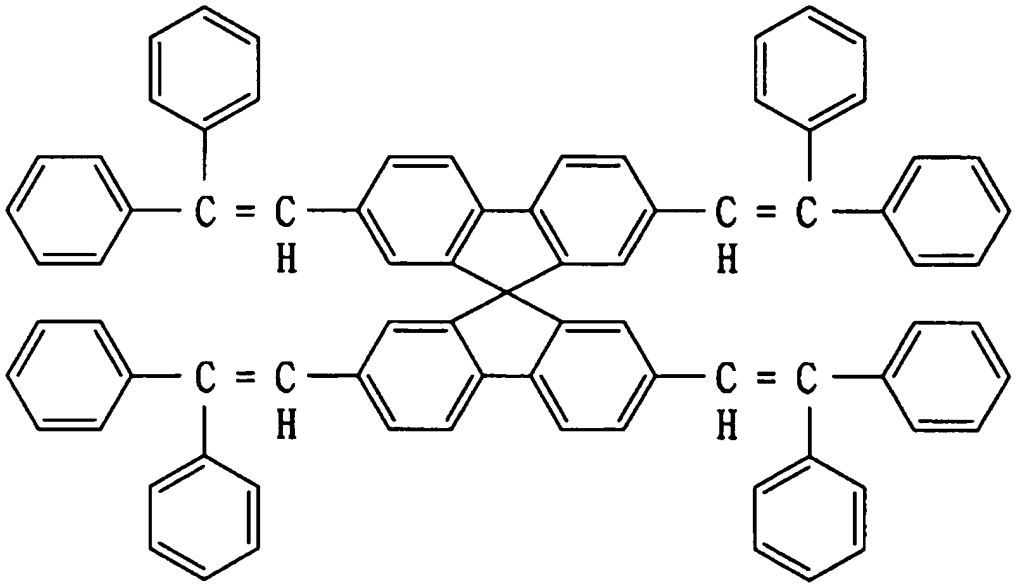
Formula 5



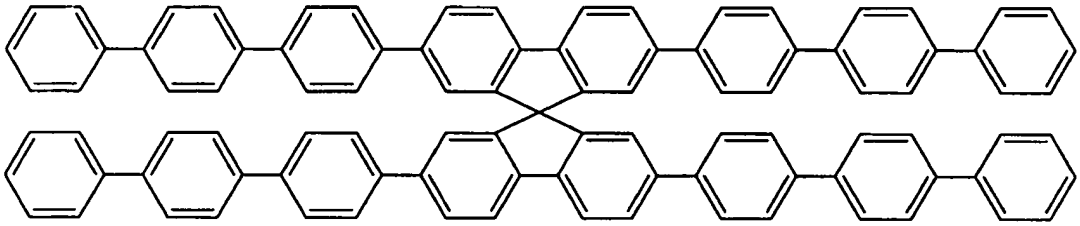
Formula 6



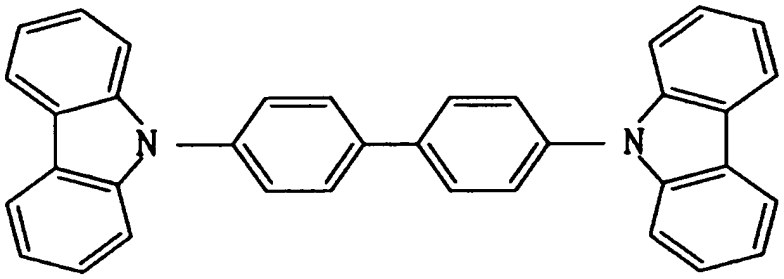
Formula 7



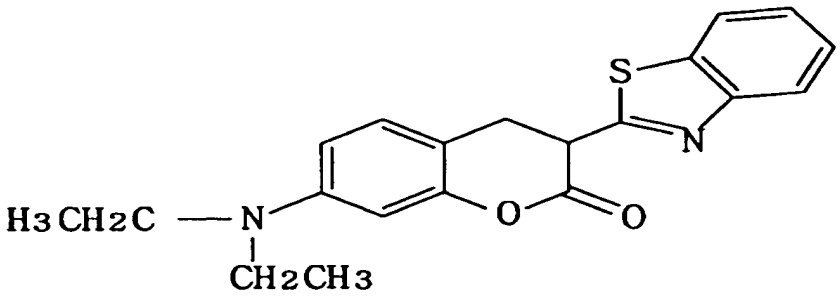
Formula 8



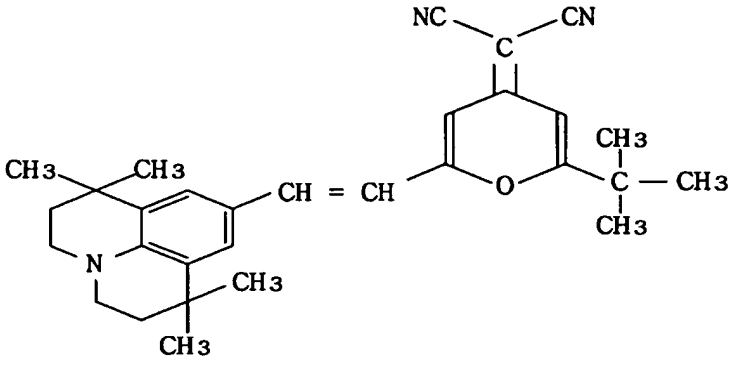
Formula 9



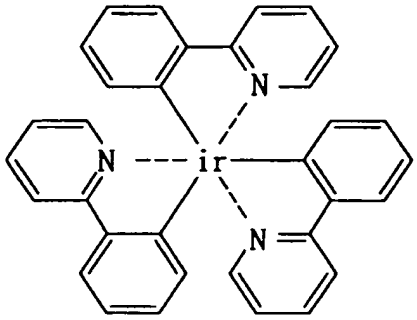
Formula 10



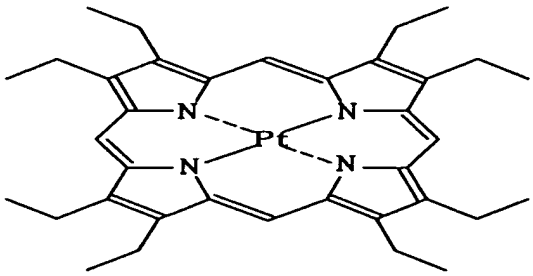
Formula 11



Formula 12



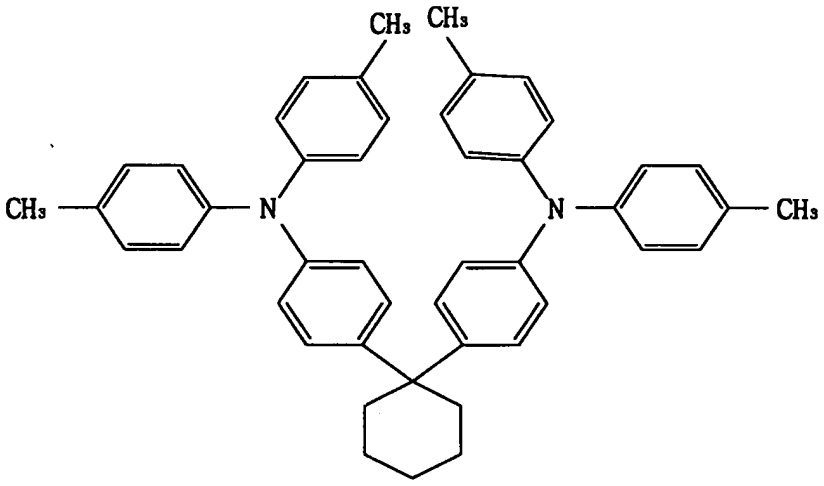
Formula 13



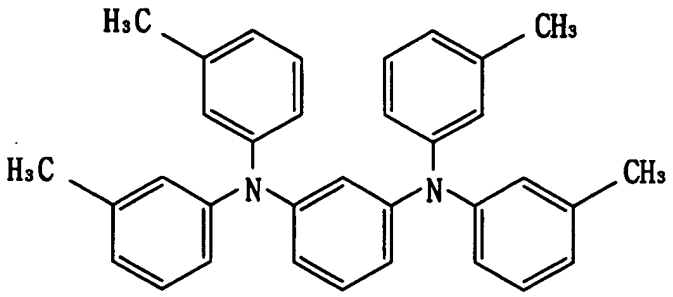
4. The donor film of the low molecular weight full color organic electroluminescent display device of claim 1, wherein the transfer layer further comprises at least one layer selected from the group consisting of a hole injection layer, a hole transporting layer, a hole blocking layer and an electron transporting layer.

5. The donor film of the low molecular weight full color organic electroluminescent display device of claim 4, wherein the hole transmitting layer is a compound represented by at least one of the following Formulas 14 to 18:

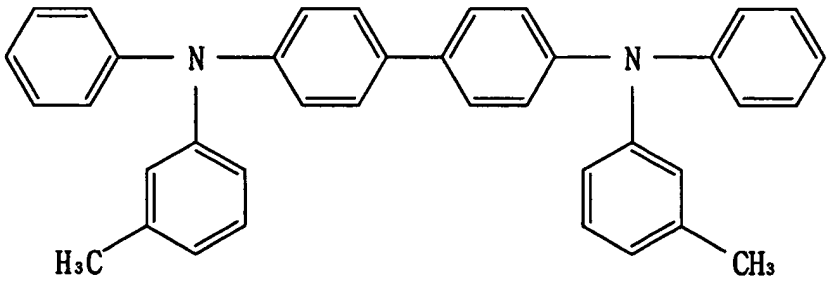
Formula 14



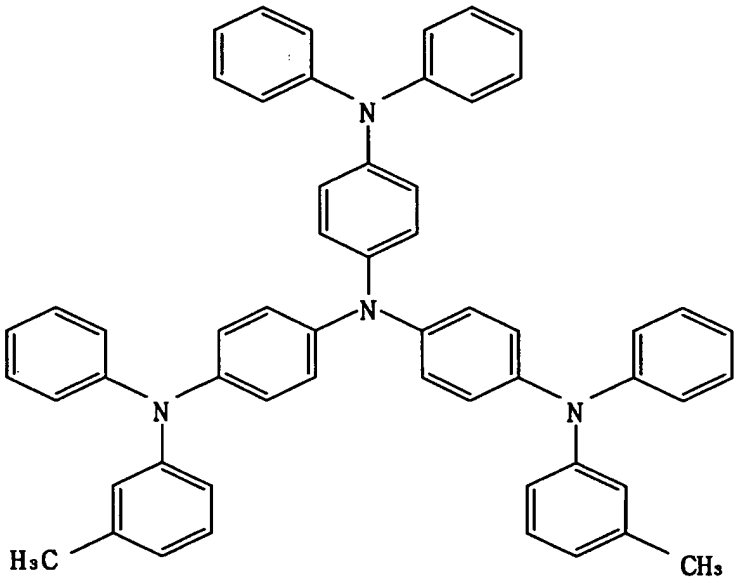
Formula 15



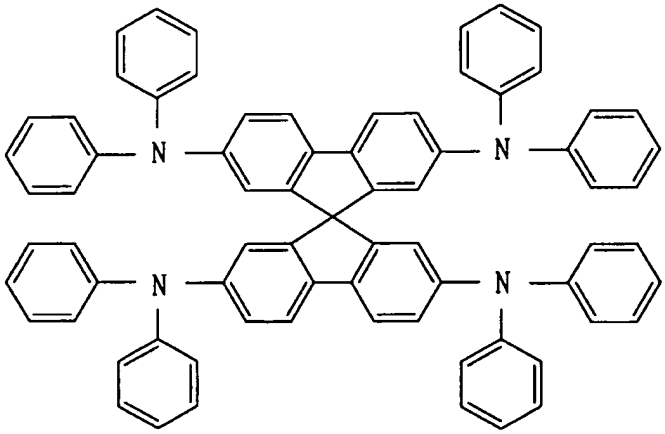
Formula 16



Formula 17

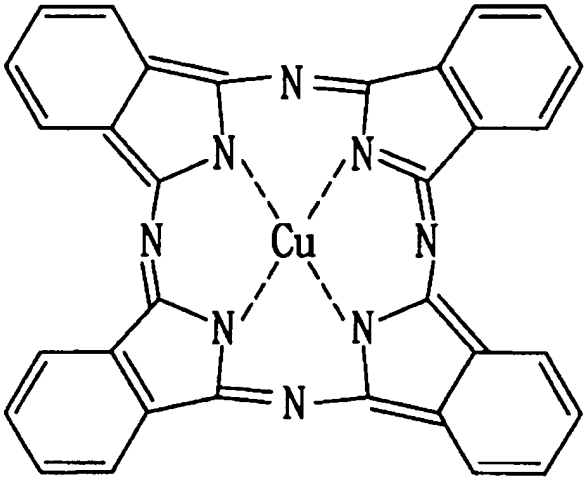


Formula 18

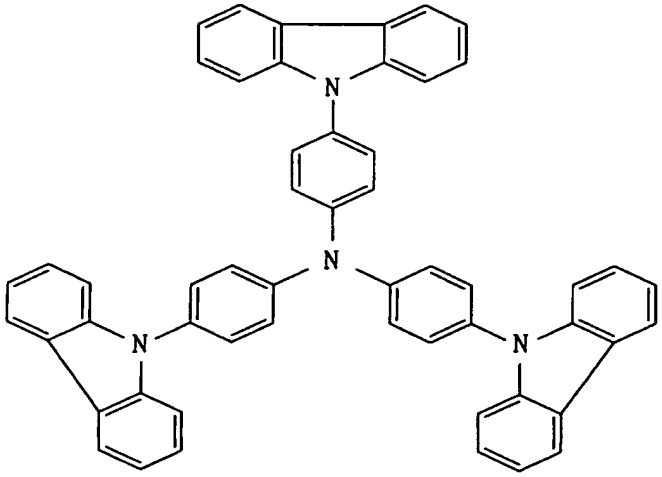


6. The donor film of the low molecular weight full color organic electroluminescent display device of claim 4, wherein the hole injecting layer is a compound represented by at least one of the following Formulas 19 to 23:

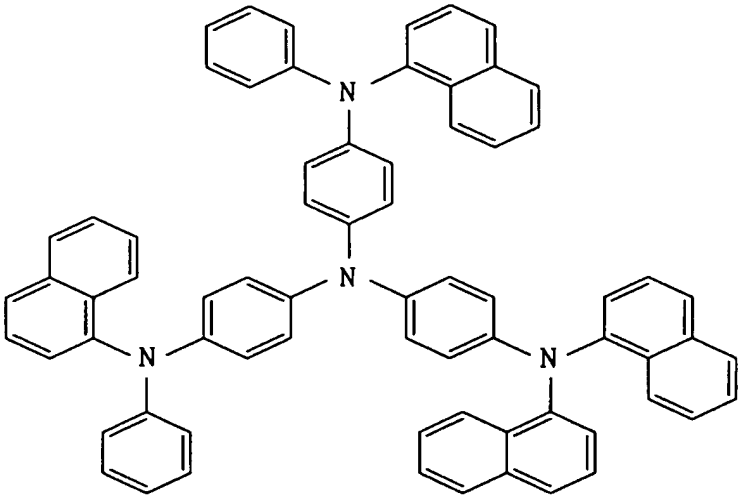
Formula 19



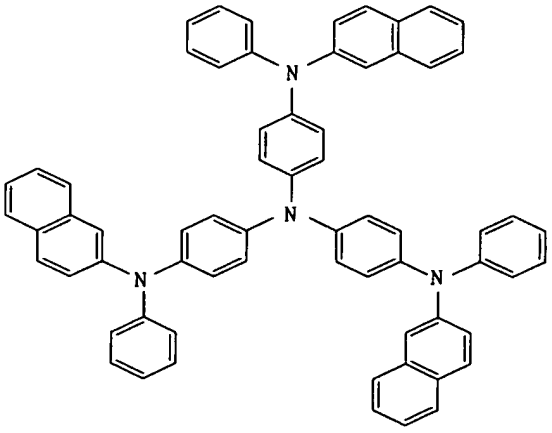
Formula 20



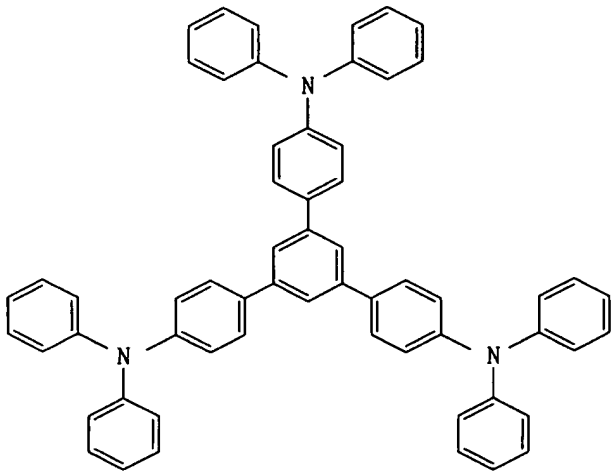
Formula 21



Formula 22



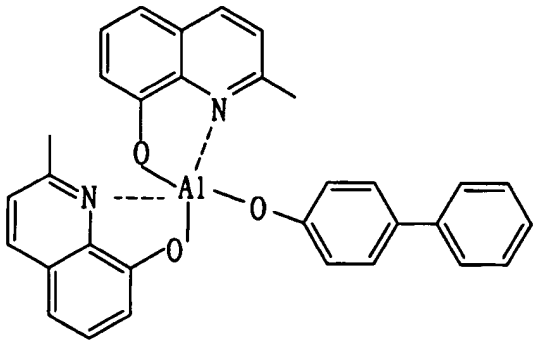
Formula 23



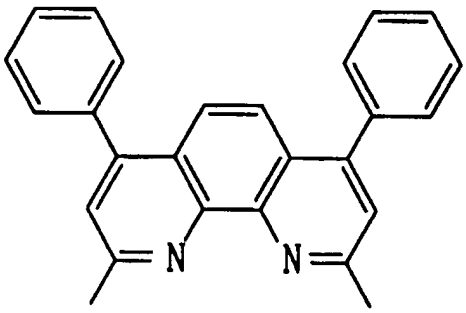
7. The donor film of the low molecular weight full color organic electroluminescent display device of claim 4, wherein the electron injecting layer is formed of one selected from the group consisting of 1,3,4-oxadiazole derivative, 1,2,4-triazole derivative, Alq_3, Ga complex, and PBD.

8. The donor film of the low molecular weight full color organic electroluminescent display device of claim 4, wherein the hole blocking layer is formed of one selected from the group consisting of TAZ, spiro-TAZ, compound represented by at least one of the following Formulas 24 to 26:

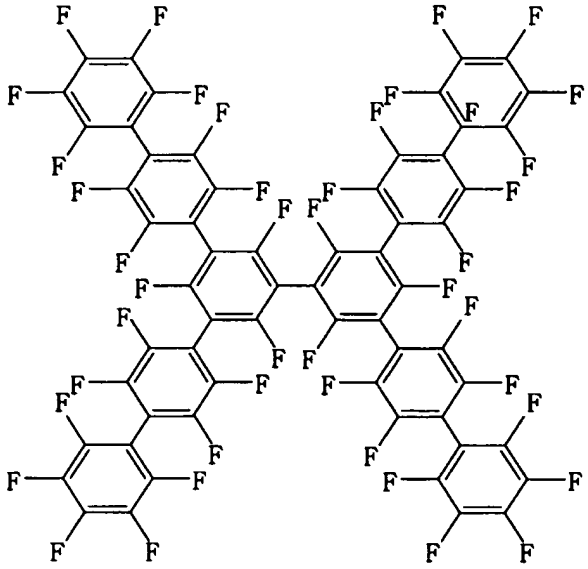
Formula 24



Formula 25



Formula 26



9. The donor film of a low molecular weight full color organic electroluminescent display device of claim 1, wherein the photothermal conversion layer comprises a light absorbing material to absorb light in the ultraviolet or visible ray range.

10. The donor film of a low molecular weight full color organic electroluminescent display device of claim 1, wherein the photothermal conversion layer comprises a polymer in which a material selected from carbon black, graphite and infrared ray absorbing material is dispersed.

11. The donor film of a low molecular weight full color organic electroluminescent display device of claim 1, wherein the substrate film comprises a transparent polymer selected from the group consisting of polycarbonate, polyester, polyethyleneterephthalate, polyethylenenaphthalate, polyestersulfonate, polysulfonate, polyarylate, fluorinated polyimide, fluorinated resin, polyacryl, polyepoxy, polyethylene and polystyrene.

12. A method to fabricate a low molecular weight full color organic electroluminescent display device comprising:

forming a first electrode by patterning the first electrode on a substrate;

forming at least one first organic film layer on the first electrode by one of spin coating and a deposition method;

forming an emitting layer to embody full color on a pixel region by a laser induced thermal imaging method;

forming at least one second organic film layer on the emitting layer by one of spin coating and the deposition method; and

forming a second electrode on the second organic film layer/layers.

13. The method of claim 12, wherein the at least one first organic film layer comprises one of a hole injection layer and a hole transport layer, and the at least one second organic film layer comprises a layer/layers selected from an electron injection layer, a hole blocking layer and an electron transport layer when the first electrode is an anode electrode.

14. The method of claim 13, wherein the at least one first organic film layer comprises a layer/layers selected from an electron transport layer, a hole blocking layer and an electron injection layer, and the at least one second organic film layer comprises one of a hole transport layer and a hole injection layer when the first electrode is the cathode electrode.

15. The method of claim 12, wherein the emitting layer is formed by one of spin coating and depositing a low molecular weight emitting material for red, green and blue colors on a donor film to transmit the emitting material.

16. The method of claim 12, wherein the emitting layer consists of single layers of each red, green and blue or multi-stacked organic layer including the emitting material for red, green and blue and/or hole transporting layer and/or electron transporting layer.

17. A method to fabricate a low molecular weight full color organic electroluminescent display device comprising:

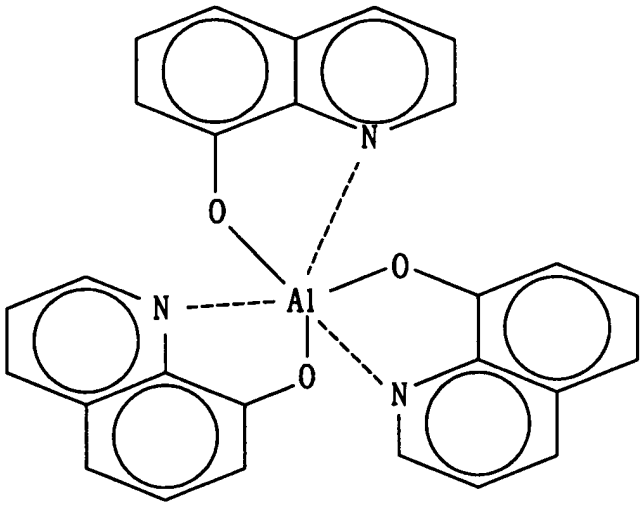
arranging a donor film comprising a low molecular weight organic thin film material comprising substrate film, a photothermal conversion layer and a low molecular weight organic electroluminescent material layer at a position spaced apart from a substrate at a predetermined distance at a position in which a pixel region of the substrate is formed;

irradiating the donor film by a laser to separate the low molecular weight organic thin film material layer in a region wherein a pixel region is formed from the donor film so that the low molecular weight organic thin film material layer is adhered to the substrate by a first adhesion force, the low molecular weight organic thin film material layer of a region onto which laser is not irradiated is fixed to the photothermal conversion layer by a second adhesion force, and the laser irradiated low molecular weight organic thin film material layer and laser non-irradiated low molecular weight organic thin film material layer are separated with respect to each other to cause mass transition and transfering the low molecular weight organic thin film material layer in the pixel region from the photothermal conversion layer to the substrate due to an adhesive force between laser irradiated low molecular weight organic thin film material layer region and laser non-irradiated low molecular weight organic thin film material layer being weaker than the first and second adhesion forces; and

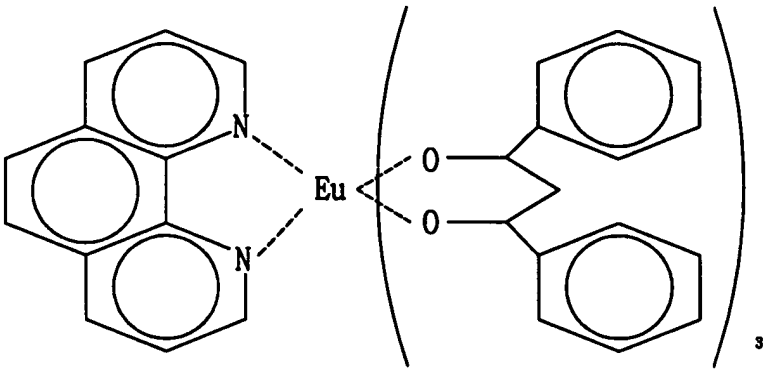
performing heat treatment after completing transferring the low molecular weight organic thin film material layer in the pixel region.

18. The method of claim 17, wherein the low molecular weight organic electroluminescent material layer is at least one compound selected from the following Formulas 1 to 13:

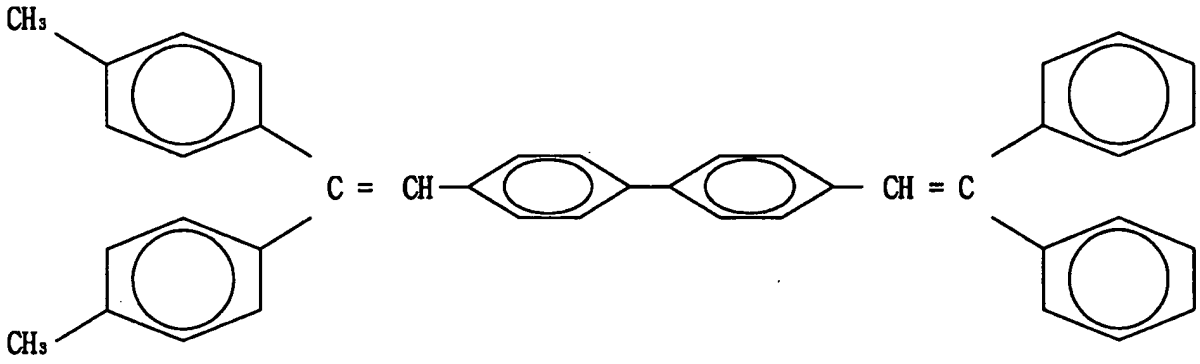
Formula 1



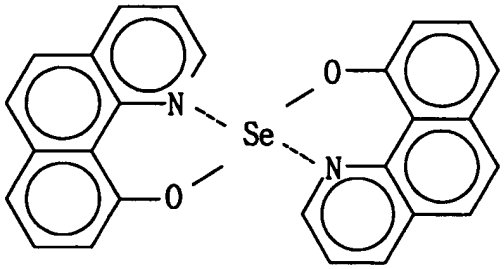
Formula 2



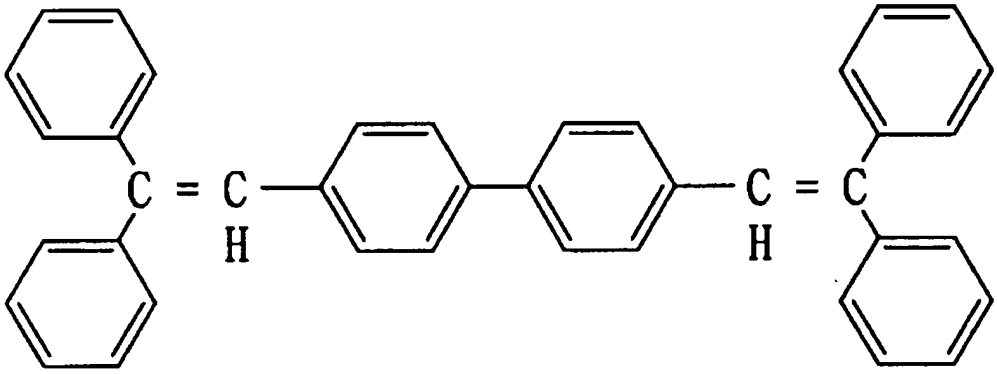
Formula 3



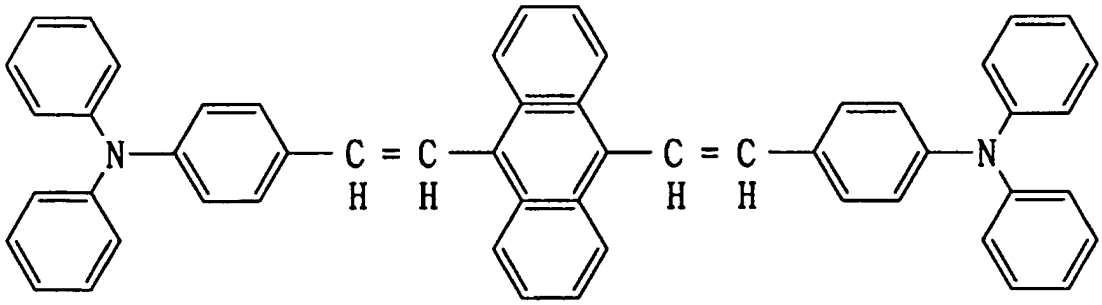
Formula 4



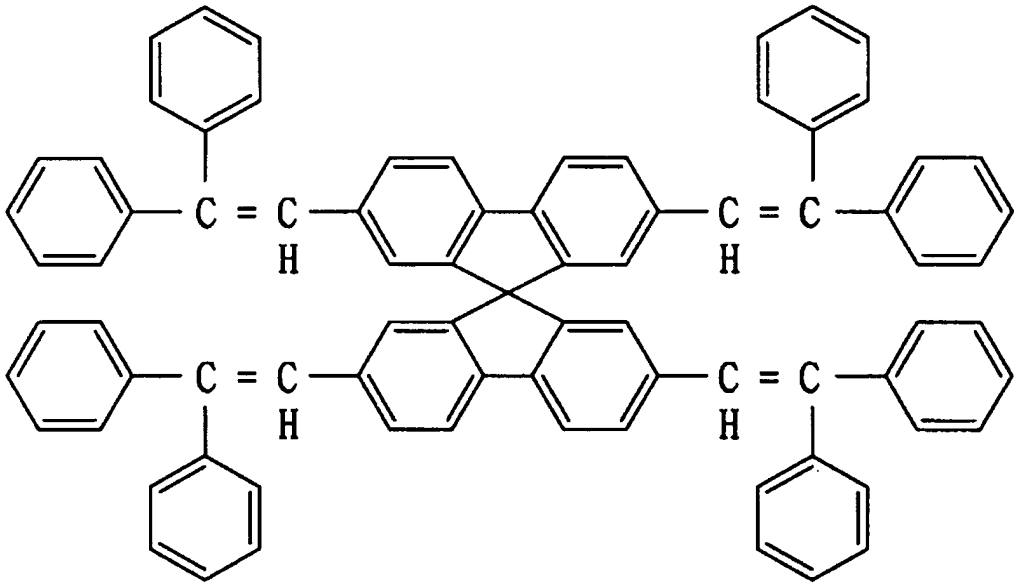
Formula 5



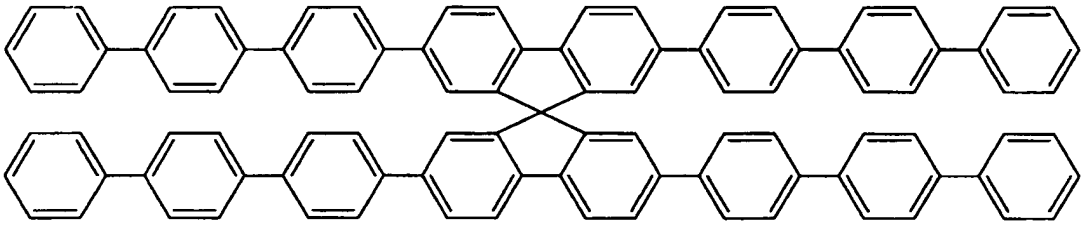
Formula 6



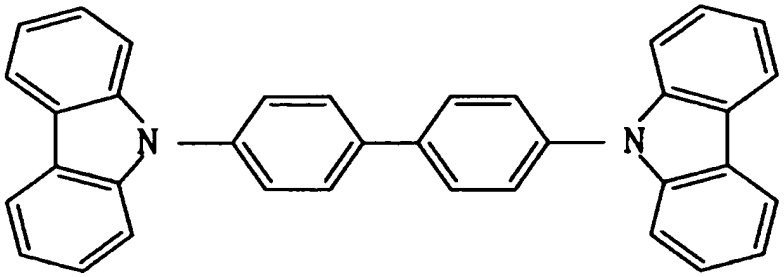
Formula 7



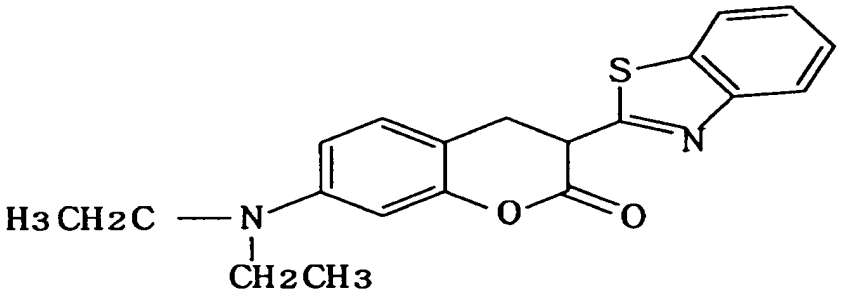
Formula 8



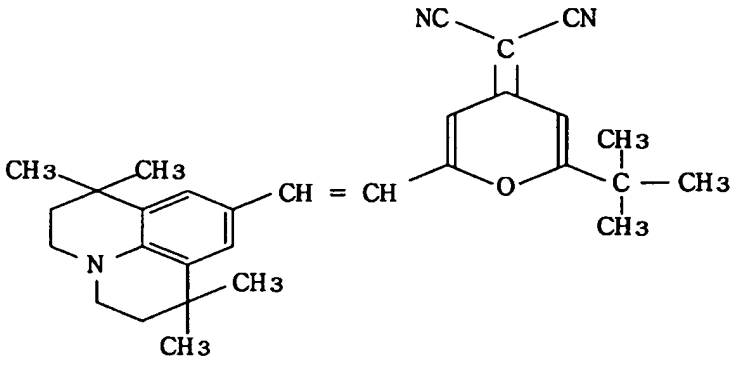
Formula 9



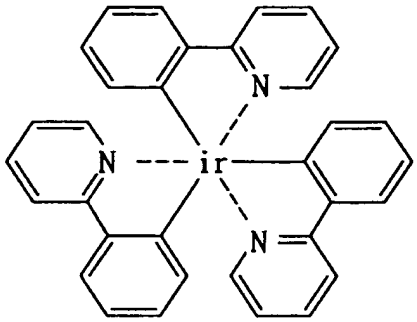
Formula 10



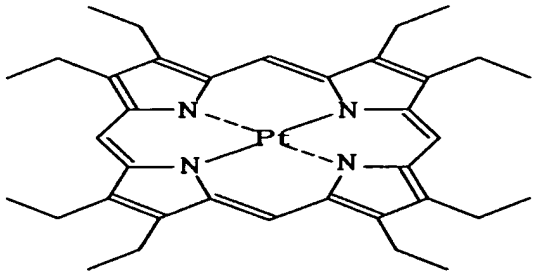
Formula 11



Formula 12



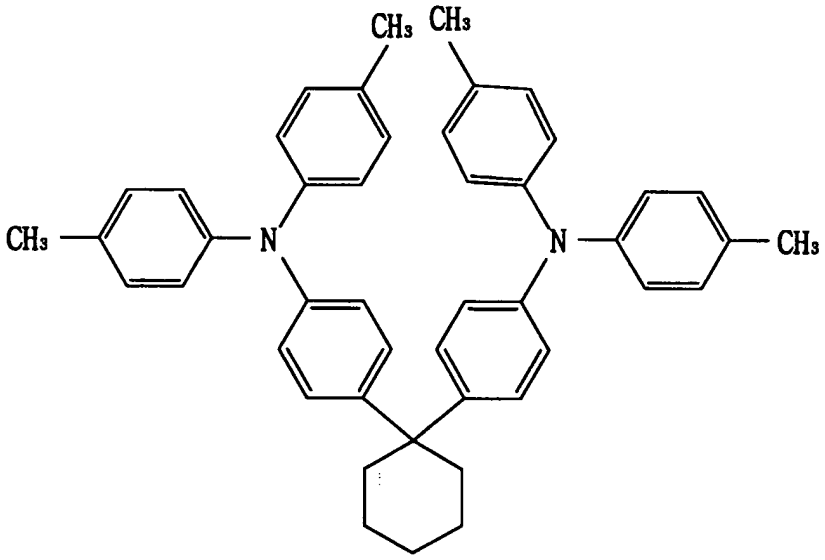
Formula 13



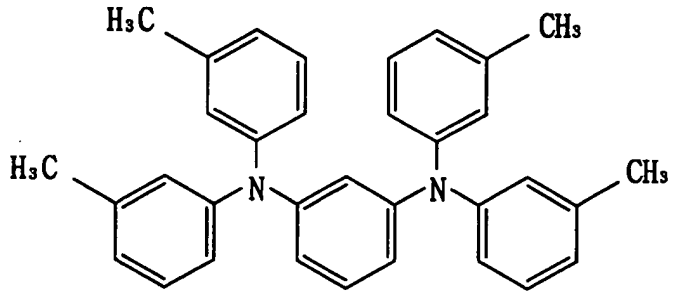
19. The method of claim 17, wherein the low molecular weight organic thin film material layer further comprises at least one layer selected from the group consisting of a hole injection layer, a hole transporting layer, a hole blocking layer and an electron transporting layer.

20. The method of claim 19, wherein the hole transmitting layer is a compound represented by at least one of the following Formulas 14 to 18:

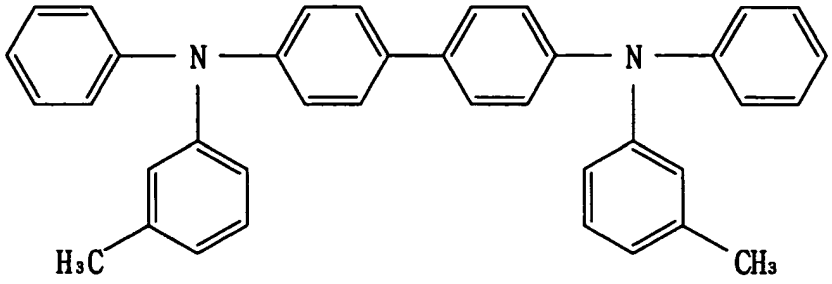
Formula 14



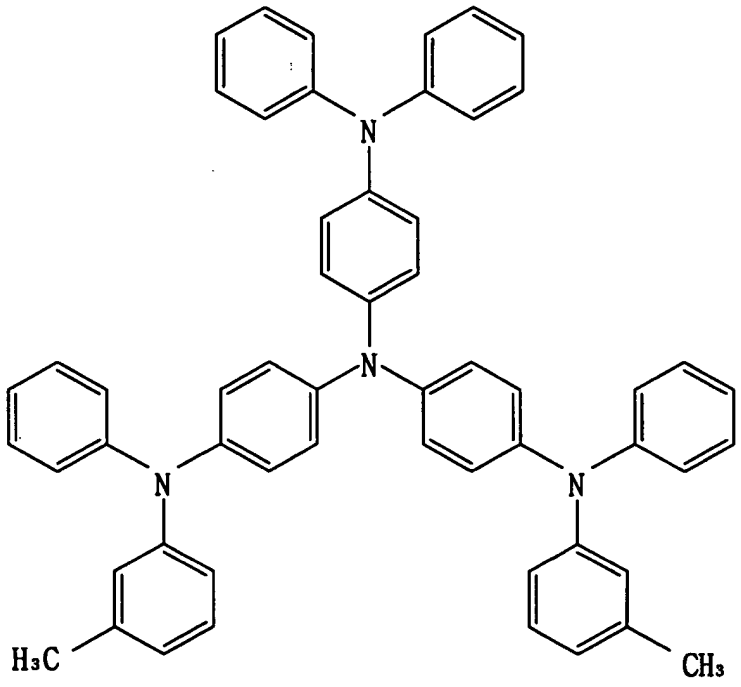
Formula 15



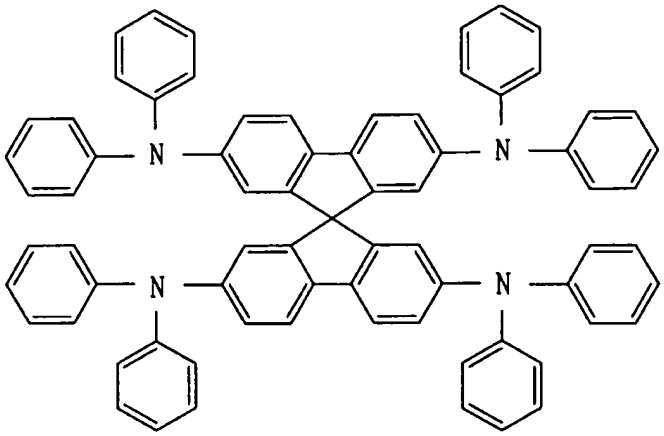
Formula 16



Formula 17

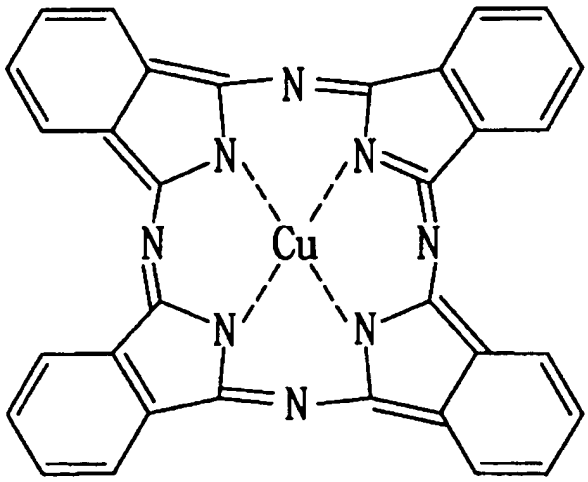


Formula 18

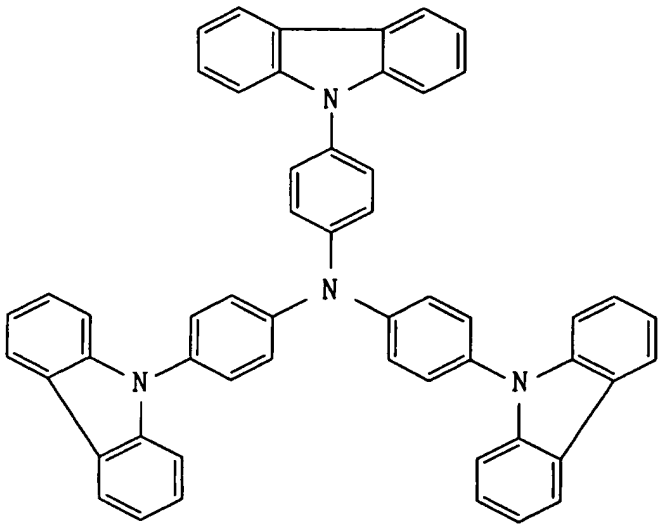


21. The method of claim 19, wherein the hole injecting layer is a compound represented by at least one of the following Formulas 19 to 23:

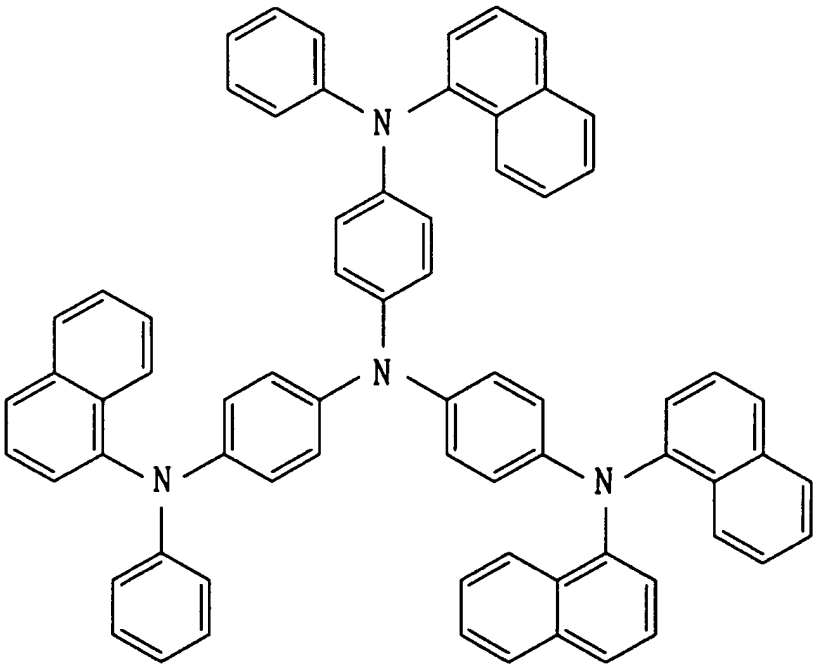
Formula 19



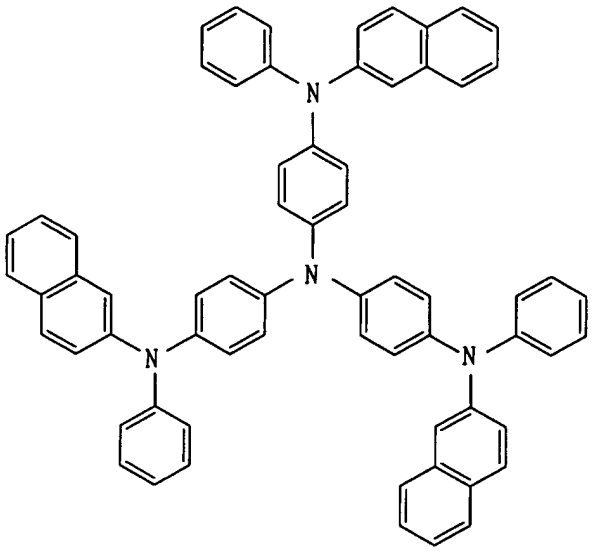
Formula 20



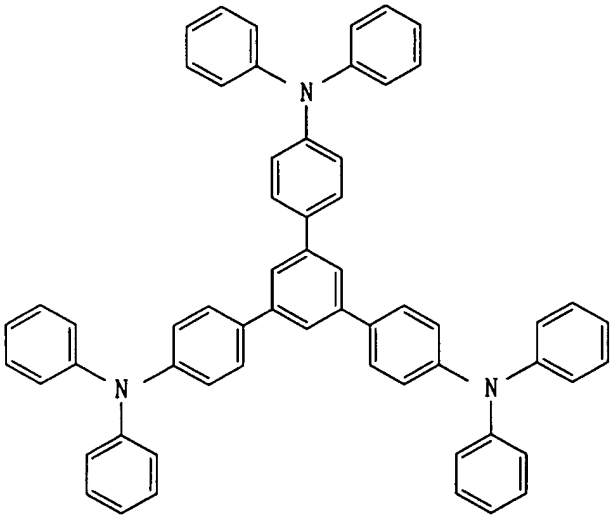
Formula 21



Formula 22



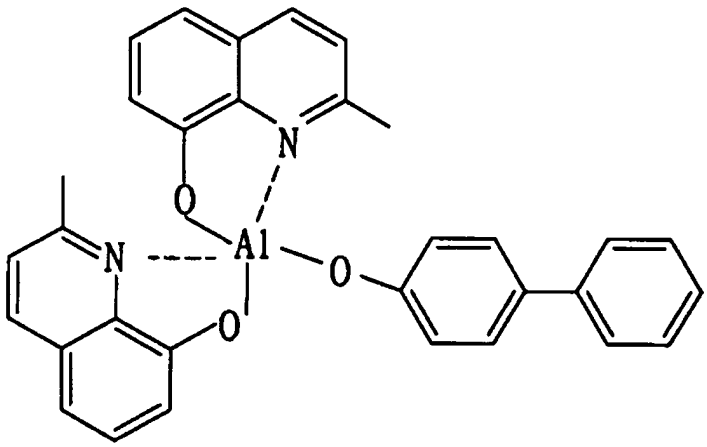
Formula 23



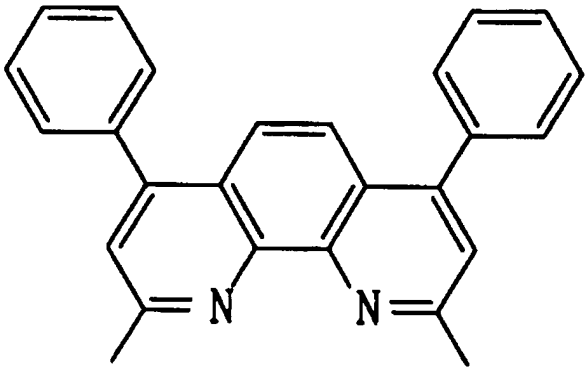
22. The method of claim 19, wherein the electron injecting layer is formed of one selected from the group consisting of 1,3,4-oxadiazole derivative, 1,2,4-triazole derivative, Alq_3, Ga complex, and PBD.

23. The method of claim 19, wherein the hole blocking layer is formed of one selected from the group consisting of TAZ, spiro-TAZ, a compound represented by the following Formulas 24 to 26.

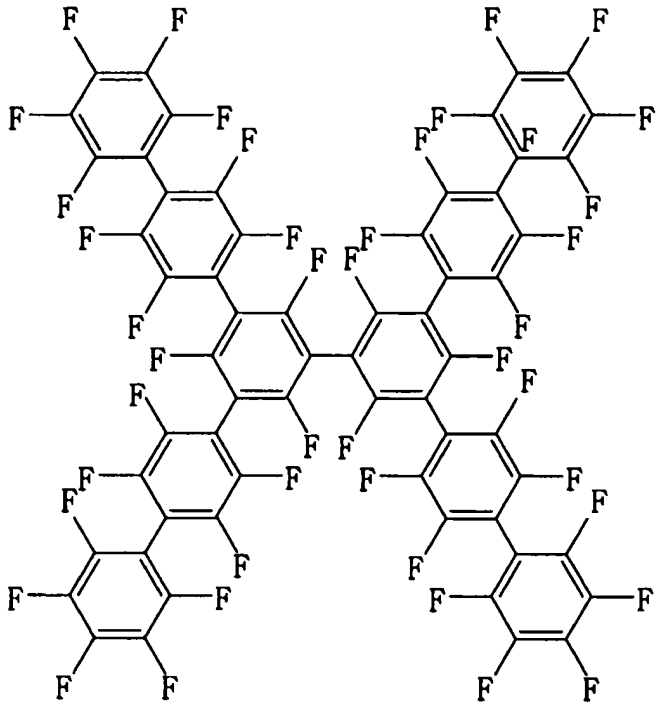
Formula 24



Formula 25



Formula 26



24. A low molecular weight full color organic electroluminescent device fabricated by:

forming a first electrode by patterning the first electrode on a substrate;

forming at least one first organic film layer on the first electrode by one of spin coating and a deposition method;

forming an emitting layer to embody full color on a pixel region by a laser induced thermal imaging method;

forming at least one second organic film layer on the emitting layer by one of spin coating and the deposition method; and

forming a second electrode on the second organic film layer/layers.

25. A low molecular weight full color organic electroluminescent device fabricated by:

arranging a donor film comprising a low molecular weight organic thin film material comprising substrate film, a photothermal conversion layer and a low molecular weight organic electroluminescent material layer at a position spaced apart from a substrate at a predetermined distance at a position in which a pixel region of the substrate is formed;

irradiating the donor film by a laser to separate the low molecular weight organic thin film material layer in a region wherein a pixel region is formed from the donor film so that the low molecular weight organic thin film material layer is adhered to the substrate by a first adhesion force, the low molecular weight organic thin film material layer of a region onto which laser is not irradiated is fixed to the photothermal conversion layer by a second adhesion force, and the laser irradiated low molecular weight organic thin film material layer and laser non-irradiated low molecular weight organic thin film material layer are separated with respect to each other to cause mass transition and transfering the low molecular weight organic thin film material layer in the pixel region from the photothermal conversion layer to the substrate due to an adhesive force between laser irradiated low molecular weight organic thin film material layer region and laser non-irradiated low molecular weight organic thin film material layer being weaker than the first and second adhesion forces; and

performing heat treatment after completing transferring the low molecular weight organic thin film material layer in the pixel region.

26. The donor film of the low molecular weight full color organic display electroluminescent device of claim 1, further including a gas-generating layer, formed in a lower part of the photothermal conversion layer.

27. The donor film of the low molecular weight full color organic display electroluminescent device of claim 26, wherein the gas-generating layer is formed of at least one material selected from the group consisting of pentaerythritol tetranitrate and trinitrotoluene.

28. The method of claim 17, further including forming a gas-generating layer in a lower part of the photothermal conversion layer.

29. The method of claim 28, wherein the gas-generating layer is formed of at least one material selected from the group consisting of pentaerythritol tetranitrate and trinitrotoluene.